NASA Glenn Success Stories

Flight Weight Designed Nickel-Hydrogen Cells Using Lightweight Nickel Fiber Electrodes

Eagle-Picher Technologies and
Bekaert Fibre Technologies <www.bekaert.com/bft>

TECHNOLOGY

The use of lightweight nickel electrodes in advanced design nickel-hydrogen batteries improves the specific energy of the state-of-the-art design by >50%. Lighter weight batteries will allow either a greater payload fraction on a spacecraft or will reduce the overall weight and launch cost.

Lightweight nickel fiber substrates produced at Bekaert Fibre Technology to NASA GRC's specifications serve as the current collector for these lightweight nickel electrodes. The nickel fiber substrate replaces the heavy nickel substrate used in standard cells. Laboratory impregnation methods developed at NASA GRC were transferred to Eagle Picher Technologies, LLC to scale-up and demonstrate manufacturability and the economics of lightweight electrode fabrication.

Eagle-Picher Industries, a major aerospace battery manufacturer, produced full-size lightweight nickel fiber electrodes that have been fabricated into flightweight hardware. A total of seven cells will be delivered to NASA GRC to demonstrate performance and life capabilities in a low earth-orbit regime.

Lightweight Nickel-Hydrogen Cells

COMMERCIAL APPLICATION

- Commercial consumer spin-offs – Nickel electrodes can be incorporated into nickel based cells for commercial applications including power tools, lawnmowers, computers, electric vehicles

ECONOMIC BENEFIT

- Incorporation of technology will result in an increase in useable specific energy and energy density of the energy storage sub system and result in a lower cost battery.

NASA APPLICATIONS

Energy storage subsystem for NASA Satellites

- Earth Science Mission
- HEDS
- DOD Missions
- Space Sciences

NASA Contact: Doris Britton
Company Contact: David Pickett (consultant); Johan Saelens (Bekaert); Rolan Farmer (EaglePicher)
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